

## **SECTION 203 EXCAVATION AND EMBANKMENT**

**203.01 DESCRIPTION.** This work is the excavation, placing, compacting and disposal of material encountered within the construction limits necessary to construct the project.

### **203.01.1 Excavation.**

**A. Unclassified Excavation.** Unclassified excavation is excavating and disposing, when required, of material from the right-of-way or construction easement areas except borrow excavation and muck excavation as defined in Subsections 203.01.1 (B) and (E).

**B. Borrow Excavation.**

**1. Unclassified Borrow.** Unclassified borrow for embankment construction is Contractor furnished excavation from outside the right-of-way or construction easement areas.

Use Department approved sources meeting current environmental and cultural resource preservation regulations.

Material from a Department-optioned or Department-owned borrow source may be available at no cost. For contractor-furnished sources, the haul distance is measured for payment under Subsection 206.04.

The applicable provisions of Subsections 102.06 and 106.02 apply to unclassified borrow.

**2. Special Borrow.** Special borrow is excavation from designated sources or from other approved sources.

Subsection 203.01.1(B)(1) and the applicable provisions of Subsection 106.02 apply to special borrow.

**C. Unclassified Channel Excavation.** Unclassified channel excavation is excavating and disposing of all materials from new water courses or channels and the widening, deepening, or straightening of existing channels.

**D. Street Excavation.** Street excavation is excavating all material to the street template.

**E. Muck Excavation.** Muck excavation is removing and disposing of unstable material below subgrade elevation in cut sections or below the natural ground line in embankment sections.

Material is considered unstable if:

1. It contains saturated or unsaturated mixtures of soils and organic matter unsuitable for foundation material, regardless of moisture content; and
2. If it cannot be excavated using the same equipment and methods as for unclassified excavation.

If a grade line is adjusted, the difference between the staked or plan lines and adjusted grade lines is not muck excavation unless unstable material is encountered at or below the final grade line. Topsoil removed below the natural ground line in embankment sections is muck excavation

if the material is determined unstable and cannot be excavated using the same equipment and methods for unclassified excavation.

Excavated unstable material areas will be cross sectioned before they are backfilled.

Do not place fill over unstable foundation soils without the Project Manager's approval. Materials placed before approval may be ordered removed and replaced at Contractor expense.

- F. **Sub-excavation.** Sub-excavation is removing unsuitable material from below the plan subgrade elevation as shown or directed.

**203.01.2 Embankment.** Place and compact excavation in roadway embankments, dikes, areas where unsuitable material is removed, holes, pits, and other roadway depressions. Prepare embankment foundations, obtain embankment material from the designated roadway, drainage, structure, culvert, or borrow excavation.

**203.02 RESERVED.**

**203.03 CONSTRUCTION REQUIREMENTS.**

**203.03.1 Excavation.**

- A. **General.** Do not begin excavation, grading, and embankment operations before the area is cleared of vegetation and obstructions under Sections 201 and 202 and erosion controls are placed as specified in the Contract.

Excavate without disturbing material and vegetation outside of the slope limits.

Use all suitable material removed from the excavation in embankments, subgrade, shoulders, topsoiling, and other designated locations. Excavated material not used as specified or directed is not paid for.

Sequence excavation of backfill or road finishing material so it is placed into final position as soon as possible. Stockpile suitable material that is not immediately used.

Construct temporary fencing to restrict livestock and vehicular traffic from the work under Subsection 607.03.5.

Replace temporarily removed fence and repair damaged fence to a condition equal to the existing fence at Contractor expense. Confine livestock when fencing is disturbed.

If excavated material from the roadway prism is used outside the embankments, furnish and place at Contractor expense, an equal quantity of borrow to replace the material.

Compact the top 8-inches (205 mm) of the subgrade in cut sections under Subsection 203.03.3.

Place special borrow in layers immediately below the subgrade surface on embankments and through cuts as specified.

- B. **Rock Blasting.**

1. **General.** Use and store explosives under Subsection 107.09.

Use current technology in rock blasting to prevent slides, minimize overbreak, and provide smooth cut slope faces free of loose or fractured rock. Design the ignition sequence and blasting pattern with

delays to produce maximum relief to the holes nearest the cut slope face.

Temporarily suspend blasting operations if the specified slopes are not produced, nearby residences, structures, utilities, or appurtenances are endangered, or the safety and convenience of the traveling public is jeopardized by fly rock, fragmentation, vibration, air blast, or overbreak.

2. **Blasting Plan.** Submit the blasting plan to the Project Manager at least two weeks before drilling and blasting operations begin and when there is a change in the proposed drilling and blasting methods. Submit the blasting plan on form CSN-55, available from the Project Manager, with the following information.

- a. Station limits of proposed blast.
- b. Plan of proposed drill hole and delay pattern including free face, burden, and spacing.
- c. Report of hole depth, diameter, burden, spacing, stemming, explosive types, powder factor, and delays.

The blasting plan is to reflect a blast design that provides for the proper drilling and blasting procedures to produce the specified results.

Revise the drilling and blasting methods as necessary to produce the specified results.

3. **Scaling.** Scale all loose or detached rock and soil masses that create a potentially dangerous situation to the work, workers, or the public. Remove the rock by barring, wedging, equipment, or using light explosive charges. Scale during or after each lift is completed. Scaling and disposing of the scaled materials is incidental to unclassified excavation.

4. **Pre-splitting Rock Slopes.**

- a. **General.** Pre-split rock cuts to a smooth plane using loaded, timed, and spaced drill holes. Produce a continuous or semi-continuous fracture between drill holes and a stable rock cut by eliminating overbreak in the backslope during primary blasting. Detonate pre-split holes before detonating the production holes.

- b. **Drilling.** Use drills equipped with mechanical devices that accurately determine the angle the drill steel enters the rock. Do not drill if the devices are missing or inoperative.

Remove overburden soil and loose or decomposed rock along the top of the excavation to produce a smooth rock surface for drilling.

Use pre-split hole diameters that are between 2½-inches (64 mm) and 3-inches (75 mm). Drill pre-split holes within 3-inches (75 mm) of the staked collar location. Holes drilled outside the 3-inch (75 mm) tolerance will be rejected and not measured for payment. Drill hole intervals may vary between 24 (610 mm) and 36-inches (915 mm). A 30-inch (765 mm) interval is used to estimate the linear measurement of pre-split Contract quantities.

When the cut height exceeds 30 feet (10 m), an offset from the staked slope line, not to exceed 2 feet (610 mm) is allowed at the

top of each lift after the top lift. The actual slope cannot deviate from the plan slope by more than 2 feet (610 mm).

Control the drilling operations to insure that no hole deviates from the slope plane by more than 9-inches (230 mm) parallel or normal to the slope. Pre-split holes exceeding these limits will not be paid for.

Drilling 2 feet (610 mm) below ditch bottom to aid removing the toe berm is permitted.

Extend pre-split holes a minimum of 30 feet (9.2 m) beyond the limits of the production holes or to the end of the cut.

Maintain the length of pre-split holes for any individual lift at no more than 30 feet (9.2 m). The Project Manager may approve a written request to increase the hole length to a maximum of 60 feet (18.3 m) if it is demonstrated that the above pre-split hole tolerances and a uniform slope can be obtained. If over 5% of the pre-split holes are misaligned in any one lift, reduce the lift heights until the 9-inch (230 mm) tolerance is met.

- c. **Blasting.** Verify that the drill holes are free of obstructions for their entire depth before placing charges. Take precautions to prevent material from entering the drill holes while placing the charges.

Drill hole conditions may vary from dry to water filled. Use the type or types of explosives and blasting accessories for the conditions encountered following the manufacturer's recommendations.

Use explosives with a maximum diameter no more than one-half the diameter of the pre-split hole. Do not use bulk ammonium nitrate and fuel oil (ANFO) in the pre-split holes. Use only standard explosives manufactured specifically for pre-splitting.

If fractional portions of standard explosive cartridges are used, firmly affix them to the detonating cord to prevent the cartridges from slipping down the cord or bridging across the hole. Space fractional cartridges along the length of the detonating cord at maximum 30-inch (765 mm) centers and adjust spacing to produce the specified results.

Assemble and affix continuous column cartridge type explosives to the detonating cord following the explosive manufacturer's instructions. Furnish the Project Manager these instructions 24 hours before blasting begins.

The pre-split hole bottom charge may be larger than the line charges if it does not cause overbreak. Reduce the top charge of the pre-split hole and place it far enough below the collar to avoid overbreak and heaving.

Stem the upper 3 feet (915 mm) of all pre-split holes below the hole collar with sand or other dry, angular granular material passing a  $\frac{3}{8}$ -inch (9.5 mm) sieve.

The Contractor may pre-split the slope face before production drilling or pre-split the slope face and production blast at the same time, if the pre-split drill holes are fired simultaneously at least 100

milliseconds before the production blast. Do not delay pre-split holes more than 25 milliseconds, hole to hole, to reduce noise and ground vibration.

Do not vary the pre-split slope face by more than 1 foot (305 mm), measured perpendicular to the slope, from a plane passing through adjacent drill holes unless otherwise directed.

5. **Production Blasting.** Drill the row of production blast holes adjacent to the pre-split blast line on a plane parallel to and no closer than 6 feet (1.8 m) to the pre-split blast lines. Do not drill the production hole bottoms lower than the pre-split hole bottoms and with a diameter not greater than 6-inches (155 mm).

Detonate production holes on a delay sequence toward a free face.

Stem production holes a minimum of 3 feet (915 mm) or 0.7 times the burden distance, whichever is greater, with sand or other dry, angular granular material passing a  $\frac{3}{8}$ -inch (9.5 mm) sieve.

Perform production blasting to minimize blast damage to the backslope.

Production blasting is incidental to and included in the measurement and payment for unclassified excavation.

- C. **Rock Excavated Below Grade.** Excavate all un-yielding materials that require blasting or the use of rippers to at least 6-inches (155 mm) below subgrade within the roadbed limits. Backfill the excavation with specified or approved material. Remove or drain surface rock pockets that trap or pond water.

Rock, removed to a maximum depth of 6-inches (155 mm) below subgrade is measured and paid for as unclassified excavation. Rock removed or backfilling due to over excavating in excess of the 6-inches (155 mm) with approved backfill material is at Contractor expense.

- D. **Removing Excess Moisture.** Rework materials from excavation or borrow areas exceeding 2% of optimum moisture to the specified optimum moisture before use in embankments or as backfill. Costs to remove excess moisture from the material is incidental to the embankment.

Remove excess moisture in the finished roadbed soil, introduced or caused by construction operations, for re-use in the work at Contractor expense. Excessively wet material, caused by the construction operations that cannot be properly compacted must be removed and replaced with suitable material at Contractor expense.

- E. **Borrow Material.** Excluding special borrow, borrow material may be used only after the roadway excavation has been placed in the embankment. If excess borrow is placed creating a waste of excavation, the waste quantity will be deducted from the measured volume in the borrow area.

Provide the Project Manager 5 calendar days notice before excavating material from the borrow area so that cross sections may be taken. Do not excavate beyond the dimensions and elevations established for the borrow areas. Finish and shape all borrow areas to permit accurate measurements. Reclaim borrow areas meeting Subsection 106.02.5 requirements

- F. Step or Roughen Slopes.** Step or roughen slopes as directed. Horizontally step cutslopes, excluding rock slopes that cannot be excavated by ripping, approximately 1 to 2 feet (305 by 610 mm) wide by 1 to 2 feet (305 to 610 mm) in height. Extend the steps the continuous length of the slope, even if the slope decreases to less than 2:1.

Start the steps immediately below the backslope rounding. Cut each step opposite in direction of the preceding cut.

Leave loose material deposited on the steps during construction. Stepped slopes are not topsoiled. Seed the completed sections of the stepped slope daily.

#### **203.03.2 Embankment.**

- A. General.** Do not place stumps, trees, logs, rubbish, vegetation, muck, frozen material, pockets of rock, or other deleterious materials in embankments.

Spread sod mixed with surface soil and soil containing excessive humus or other organic materials over the embankment slopes or incorporate it into the embankments outside of the shoulder lines.

Compact embankment, backfill and embankment foundation areas, under Subsection 203.03.3.

Leave the surface of completed embankments in a roughened condition.

- B. Embankment at Structures.** Do not place rocks, broken concrete, or other solid material in areas where piling is to be driven.

Do not place embankment against any backwall or abutment until the concrete has cured for 10 days or has reached 70% of the required strength. Furnish the Project Manager a certified laboratory test report showing the field cured cylinders meet the required strengths.

The Project Manager may approve early embankment work at backwalls or abutments with beams or girders in place, or that are cantilevered from a fixed footing or cap if the strength requirement is met.

Do not place embankment against un-supported backwalls or U-shaped abutments rigidly connected to the deck until the deck is placed and cured meeting the applicable requirements of Section 552.

The Contractor may submit to the Project Manager, a method of supporting the structure to permit early placement of embankment against the structure. If approved, all costs of the alternate method are at Contractor expense.

Place embankment in 8-inch (205 mm) maximum layers loose thickness and compact adjacent to structures, around columns and similar structural supports, and on both sides of concrete walls, box type structures, and similar structures. Extend embankment material placed above the excavation limits or ground line a minimum 10 feet (3 m) from the structure or structural support.

Restore, repair, or replace structures or structural members moved or distorted by placing and compacting embankment at Contractor expense.

Compact embankment inaccessible to rollers by mechanical tampers to the density specified in Subsection 203.03.3.

Before placing and compacting backfill, compact at least the top 8-inches (205 mm) of the existing ground under Subsection 203.03.3.

- C. Preparation of Embankment Foundations.** Bench all embankments placed and compacted on hillsides, against existing embankments; built one-half width at a time, or on slopes 6:1 or steeper when measured at right angles to the roadway centerline. Construct benches in minimum 4 foot (1.2 m) width. Maintain the horizontal inclination within 5 percent of horizontal. Backfill and compact each bench in maximum 8-inch (205 mm) layers.

Excavate each bench as close to each other as the slope will permit. Use approved material excavated from benches in the embankment.

In excavation to embankment transitions where the natural ground slope exceeds 6:1, construct the excavated benches so the natural ground surface is a minimum 12-inches (305 mm) from the top of the subgrade.

Remove frozen earth, snow and ice from the cut or embankment surface and place it outside the slope stakes at Contractor expense. Remove and dispose of this material at least 300 feet (91.5 m) ahead of the excavation and placing of the embankment.

Remove and waste frozen material, and provide the replacement borrow material at Contractor expense.

Clear the full width of the subgrade of sod and vegetative matter. Scarify the top 8-inches (205 mm) of the subgrade, water, and compact under Subsection 203.03.3 before constructing embankments 4 feet (1.2 m) high or less, or embankments placed on soils having less than 90 percent maximum density, determined by MT-210.

If lightly compacted soils are encountered that exceed 8-inches (205 mm) in depth, remove it to the depth directed. Compact the upper 8-inches (205 mm) of the ground under Subsection 203.03.3. Place the removed material in the embankment or use it for topsoil as directed. Material useable as topsoil may be placed alongside the roadway after compaction is completed.

Whenever a compacted road surface is within 3 feet (915 mm) of the subgrade, scarify the top 8-inches (205 mm) and re-compact under Subsection 203.03.3.

- D. Earth Embankment.** Place earth roadway embankment in uniform horizontal layers not exceeding 8-inches (205 mm) loose measurement and compact under Subsection 203.03.3. Continuously level, work, and maintain moisture to compact to the specified density. Uniformly work the entire surface of each layer.

Work each layer of earth embankment using a tandem type construction disk with a maximum disk spacing of 14-inches (355 mm) and a minimum worn disk diameter of 25-inches (635 mm). Larger disks may be used if the ratio of disk spacing to disk size is comparable to the above dimensions. Leave the embankment slopes in a roughened condition.

- E. Rock Embankment.** When the excavated material contains more than 25% rock by volume, 6-inch or larger (155 mm) in its greatest dimension, place the embankment in layers 2-inches (50 mm) thicker than the maximum size rock in the material not to exceed 24-inches (610 mm) loose thickness.

Individual rocks and boulders larger than 24-inches (610 mm) in diameter may be placed in the embankment if the rocks do not exceed 48-inches (1.2 m) vertical height after placement, are evenly distributed, and are spaced to allow placing and compacting of the soil in horizontal layers.

Place and compact the upper 2 feet (610 mm) of the embankment in maximum 8-inch (205 mm) layers loose thickness as specified in Subsection 203.03.2(D).

Dump and work rock from excavations to the stream face when the embankments are adjacent to streams or channels. Prevent the rock from entering the stream. This work is incidental to unclassified excavation.

- F. Embankment Over Swampy Areas.** On low, swampy ground incapable of supporting haul equipment, construct the lower part of the embankment by dumping successive loads of uniformly distributed material in layers thick enough to support the equipment. Place subsequent layers under Subsection 203.03.2 (D) or (E) as directed. Install erosion controls as specified.
- G. Disposal of Unsuitable or Excess Material.** Place excess or unsuitable excavated material, including rock and boulders, not useable in embankments in the side slopes of the nearest fill as directed. Dispose of excess or unsuitable material that cannot be incorporated into side slopes at Contractor expense. Slope and shape all disposal areas to blend into the surrounding terrain and meet the requirements of Subsections 106.02.5 and 107.11.

**203.03.3 Moisture and Density Requirements.** Compact each layer of material to the in-place density requirements of Table 203-1 for the method of moisture and density control used. The moisture and density control will be the Proctor method or the Zero Air Voids method, determined by the Project Manager.

For A-1 material in embankments, MT 218 and MT 230 tests will be used.

Compact safety slope embankments to a minimum 90% of maximum density with no optimum moisture requirement. The safety slope is the embankment placed from an existing shoulder to a catch point on the original ground not supporting any portion of the surfacing.

Compact rock embankments that cannot be tested by Montana Test Methods MT-212, MT-215, and MT-218 (Proctor Method) or MT-229 (Zero Air Voids Method) with compaction equipment and hauling and spreading equipment. Use grid rollers, pneumatic-tired rollers, vibrating rollers, vibrating compactors, or self-propelled tamping rollers. Do not use sheepfoot rollers unless approved. Use water as required.



**TABLE 203-1  
COMPACTION REQUIREMENTS**

| COMPACTION CONTROL METHOD   |  |   |
|---|--|---|
| Material Compacted  | Proctor Method<br>Test Methods: MT-210 or<br>AASHTO T99, MT-212,<br>MT-215, MT-218 | Zero Air Voids Method<br>Test Method:<br>MT-299 |
| Earth Embankment Including all<br>Backfills<br>Top 8 Inches (205 mm) of Subgrade in<br>Cut Sections Culvert Foundations | Minimum 95% of<br>Maximum Density at<br>Optimum Moisture $\pm 2\%$                 | Less than 10% Air-filled<br>Voids               |
| Top 8 Inches (205 mm) of Embankment<br>Foundations and Backfill Foundations   | Minimum 90% of<br>Maximum Density at<br>Optimum Moisture $\pm 2\%$                 | Less Than 16% Air-filled<br>Voids               |

**203.03.4 Sloping and Finishing.**

- A. Sloping.** Finish and shape all cut slopes, ditches, embankments, and structure berms to a uniform, rough textured surface, except for stepped slopes. Scarify smooth slopes.

Where roadway slopes are not completed to the planned or directed lines and the material from the backslope erodes, sloughs, or slides due to incomplete erosion control measures or the Contractor's operations, the removal of the material and restoration of the slope is at Contractor expense.

Where roadway slopes are completed to the plan or directed lines, all required erosion control devices are in place as specified, and the material from the completed slopes erodes, sloughs, or slides onto the roadway prism before final acceptance of the work, through no fault of the Contractor, the removing of the slide material, potential slide material, and the drainage excavation is paid for at an agreed unit price or on a force account basis under Subsection 109.04.

When directed, widen cuts and flatten slopes to obtain additional excavation for embankments or to increase slope stability. The Project Manager may steepen stable rock slopes. This work is measured and paid for as unclassified excavation unless it requires non-contract construction methods increasing costs that are considered extra work under Subsection 104.03.

- B. Finishing.** Finish the entire roadbed to the final elevations specified. Do not place organic, or other deleterious material in the top 4-inches (105 mm) of the roadbed surface. Remove and dispose of partly buried oversize material not passing a 4-inch (105 mm) square-mesh screen from the roadbed surface. Finish the grade so it does not deviate more than 0.1 foot (30 mm) at any point from the staked elevation, and so the sum of the deviations from the true grade of any two points not more than 30 feet (9.2 m) apart do not exceed 0.1 foot (30 mm).

**203.03.5 Maintenance of Constructed Roadway.** Maintain the roadway during construction so it is continuously well drained.

Prevent erosion damage to embankments and stream siltation under Section 208. Keep all drainage ditches and structures open and free from debris until final acceptance.

If grading work is suspended, blade smooth and grade the entire roadway area to prevent water from collecting or ponding on the roadway. Maintain the roadway during suspension periods to the specified grade and cross section at Contractor expense.

Maintain erosion and siltation control devices meeting the Contract requirements at all times.

**203.03.6 Topsoil-Salvaging and Placing.** Remove topsoil from the excavation and embankment foundations to the specified depth without removing subsoil. Place topsoil on the completed graded roadway to the lines, grades, and elevations specified. Place topsoil on all slopes, excluding above the subgrade of the roadway inslopes and on slopes 2:1 or steeper. Place topsoil to an average 4-inch (105 mm) loose depth. Give preference to backslopes when placing topsoil.

Stockpile topsoil at acceptable selected locations within the right-of-way. When construction operations do not permit stockpiling within the right-of-way, make arrangements for stockpile sites outside the right-of-way at Contractor expense.

Construct stockpiles so drainage is maintained and topsoil is easily reclaimed. Provide erosion controls following best management practice.

#### **203.04 METHOD OF MEASUREMENT.**

**203.04.1 Excavation.** The quantities of unclassified excavation, unclassified borrow excavation, special borrow, unclassified channel excavation, street excavation, sub-excavation, and muck excavation for payment is the staked quantities calculated in cubic yards (cubic meters) under Subsection 109.01.

Remeasurements will be taken only: (1) in slide areas not the fault of the Contractor; (2) in excavated areas outside the staked lines and grades authorized by the Project Manager; (3) in un-staked areas such as borrow areas, muck excavations, sub-excavations, and un-staked excavations authorized by the Project Manager. These areas of excavation and borrow are measured in their original position by cross sectioning the areas excavated; and (4) if there is disagreement over the accuracy of quantities computed from the staked lines and grades. Either party to the Contract may request re-measurement of specific work areas.

Excavation requiring more than one handling before placement is measured and paid for at the contract unit price for unclassified excavation for each approved handling or may be paid for as another item of work for the second handling.

Authorized excavation of rock, shale, muck, or unsuitable material below grade necessary to provide the designed thickness of backfill is measured for payment. If the designated bottom plane of the excavation falls within a layer of rock, the below-grade excavation to the bottom of the layer, not exceeding 6-inches (155 mm) below grade, is considered authorized and is measured for payment. Rock excavation exceeding 6-inches (155 mm) below grade is not measured for payment. If the nature of the material, the thickness of the layers or strata, and method of

operations make it practical to excavate only to the plan depth, any material removed below plan depth is not measured.

Measurements are made for unusable materials excavated and removed.

Useable material temporarily removed and replaced for Contractor convenience is not measured.

The actual quantities of plan and approved sub-excavation are measured and added to the quantities of unclassified excavation for payment.

Material that can not be excavated by the methods used for the unclassified excavation is measured and paid for as muck excavation.

Muck excavation reworked under Subsection 203.03.1(D) is measured and paid for as unclassified excavation for the second handling.

Hauling muck excavation to the disposal areas is measured and paid for as haul under Section 206.

When the Contract does not contain a bid item for muck excavation and an area is determined unstable under Subsection 203.01.1 (E)(1 and 2), the muck excavation quantity is measured and paid for at an agreed price or force account basis under Subsection 109.04. Measurement and payment for muck excavation at the agreed price includes all excavating and hauling, disposing of all stumps, logs, and other debris encountered in the excavation, all pumping and de-watering required, and finishing of the planned disposal areas.

Material removed and replaced for Contractor convenience and removal and disposal of unusable materials from borrow areas is not measured for payment. Special borrow removed from areas before staking or cross sectioning is not measured for payment.

Unclassified excavation allowed for pre-split drill equipment clearance is calculated from the area bounded by the plan slope and lines parallel to plan slope, offset 2 feet (610 mm) for each 50-foot (15.2 m) increment in vertical cut height. The quantity for drill equipment clearance where the cut slope height is less than 50 feet (15.2 m) is not measured.

Excavation used as select or stockpiled select material is measured by the cubic yard (cubic meter) in its original position.

Removed and placed stockpile material is measured using the volume in its original excavated position.

Where it is impractical to measure material by the cross-section method, alternate methods involving three-dimensional measurements may be used.

Channel excavation is measured and paid for as unclassified excavation.

Street excavation is measured and paid for as unclassified excavation.

**203.04.2 Drill Pre-splitting Holes.** Drill pre-splitting holes are measured by the linear foot (meter). The measurement is made from the rock surface to the roadway grade or to a predetermined bench elevation. The quantity of drill pre-splitting holes shown in the Contract is not guaranteed, and the department reserves the right to increase or decrease this item with no adjustment in the contract unit price.

**203.04.3 Embankment in Place.** When the Contract contains a bid item for "Embankment in Place", all roadway excavation and construction of embankments is measured and paid for as embankment in place. The quantities measured in

cubic yards (cubic meters) for payment as embankment in place include the following:

1. The actual quantities of roadway embankment measured above the original ground line under Subsection 109.01, with no volume adjustments made for shrinkage, compaction, or subsidence;
2. The quantities of unsuitable or excess material used to flatten slopes, or otherwise disposed of, measured in its final position;
3. The topsoil replacement quantity measured in the topsoil stockpiles;
4. Minor excavation and sub-excavation directed by the Project Manager in its original position.

All other excavations are measured and paid for under other excavation bid items in the Contract or as extra work.

#### **203.04.4 Compaction.**

- A. Volume Measurement Method.** When roadbed compaction is specified in the Contract, the quantity measured for payment is the quantity of excavation incorporated in the roadway, measured under Subsection 203.04.1, excluding wasted material.

Road approaches, turnouts, wyes, and other similar facilities are included as part of the roadway. Measurement includes compaction of the natural ground cut sections under Subsection 203.03.3.

Water to reach the specified moisture content and compactive effort is not measured for payment and is incidental to roadbed compaction.

Compactive effort to obtain the specified densities includes scarifying, watering, aeration, and any other work to produce the finished roadbed and embankments.

- B. No Bid Item For Compaction.** When the Contract does not contain an item covering compaction, all work and materials to compact embankment material to the specified density is not measured for payment.
- C. Structure Backfill.** When there is no item for mechanical tamping, the compaction is not measured and paid for but is incidental to other items in this section. Compaction of structure backfill and at the ends of major structures is measured for payment if mechanical tamping is specified. Mechanical tamping is measured by the cubic yard (cubic meter) of backfill material and includes compaction of the ground below the backfill to a depth of 8-inches (205 mm).

**203.04.5 Topsoil.** Excavation of topsoil material from its original position, loading, hauling, stockpiling, and removal from the stockpile and spreading on the designated areas is measured for payment by the cubic yard (cubic meter) in the stockpile before final placement.

Before measurement, shape and smooth each stockpile into the smallest practical area. Haul is not measured.

Topsoil removed from cut areas is not deducted from the unclassified excavation, roadbed compaction, or haul quantities.

Measurement is made as if the topsoil had not been removed.

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Topsoil removed from embankment before placing embankment and from borrow areas is measured as topsoil-salvaging and placing and is not measured for payment under any other pay items.

**203.05 BASIS OF PAYMENT.** Payment for the completed and accepted quantities will be made under the following:

| <b><u>Pay Item</u></b>          | <b><u>Pay Unit</u></b>     |
|---------------------------------|----------------------------|
| Unclassified Excavation         | Cubic Yard (cubic meter)   |
| Unclassified Borrow Excavation  | Cubic Yard (cubic meter)   |
| Special Borrow                  | Cubic Yard (cubic meter)   |
| Unclassified Channel Excavation | Cubic Yard (cubic meter)   |
| Sub-excavation                  | Cubic Yard (cubic meter)   |
| Muck Excavation                 | Cubic Yard (cubic meter)   |
| Drill Pre-splitting Holes       | Linear Foot (linear meter) |
| Embankment in Place             | Cubic Yard (cubic Meter)   |
| Roadbed Compaction              | Cubic Yard (cubic meter)   |
| Mechanical Backfill Compaction  | Cubic Yard (cubic meter)   |
| Topsoil                         | Cubic Yard (cubic meter)   |

Payment at the contract unit prices is full compensation for all resources necessary to complete these items of work under the Contract.